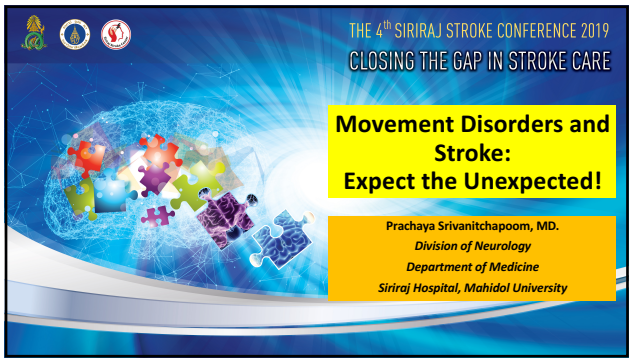
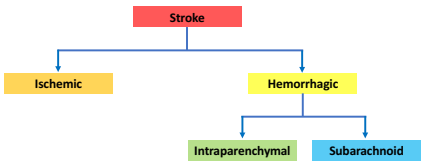


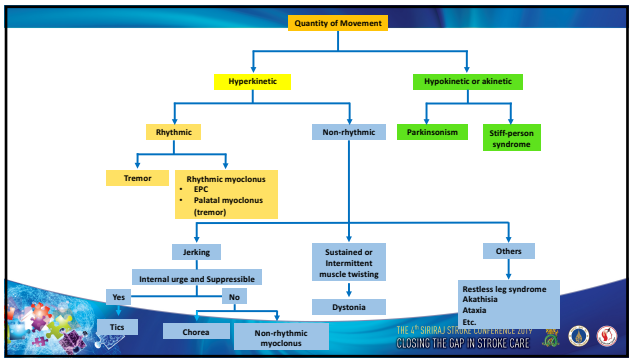
Objective

- Classification of stroke
- Approach to movement disorders
- Epidemiology and characteristics of patients with movement disorders after stroke
- Possible mechanism of movement disorders after stroke
- Example of movement disorders related to stroke
- Prognosis and Treatment

Classification of Stroke



Hankey GJ. Lancet 2017;389:641-54.



Patterns of Movement Disorders

Phenomenology	Quantity	Rhythmicity	Internal urge	Suppressible	Specific pattern
Tremor	Hyperkinetic	Rhythmic	No	No	Sinusoidal or oscillating
Rhythmic myoclonus	Hyperkinetic	Rhythmic	No	No	Brief jerking or shock-like
Non-rhythmic myoclonus	Hyperkinetic	Non-rhythmic	No	No	Brief jerking or shock-like
Chorea	Hyperkinetic	Non-rhythmic	No	No or partial*	Random and continuous flowing or dance-like
Tics	Hyperkinetic	Non-rhythmic	Yes#	Yes**	Brief jerking
Dystonia	Hyperkinetic	Non-rhythmic	No	No	Sustained or intermittent muscle contraction and/or postural abnormality
Parkinsonism	Hypokinetic or akinetic	-	No	No	Combination of tremor, bradykinesia, rigidity and postural instability

CLOSING THE GAP IN STROKE CARE

What is/are the Prevalence of Movement Disorders After Stroke?

Hyperkinetic movement disorders during and after acute stroke: The Lausanne Stroke Registry

29/2500 ~ 1%

F. Ghika-Schmid, J. Ghika *, F. Regli, J. Bogousslavsky

Department of Neurology, Centre Hospitalier Universitaire Vaudois, CHUV-BH 13, 1011 Lausanne, Switzerland

Received 21 March 1996; revised 16 July 1996; accepted 8 August 1996

PAPER

Ghika-Schmid et al. J Neurol Sci 1997;146:109-16.

Post-stroke movement disorders: report of 56 patients

F Alarcón, J C M Zijlmans, G Dueñas, N Cevallos

56/1500 ~ 3.7%

Alarcón et al. J Neurol Neurosurg Psychiatry 2004;75:1568-74.

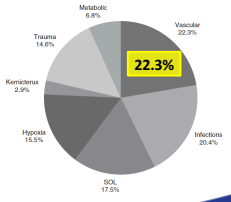
CLOSING THE GAP IN STROKE CARE

How Many Percent of Cerebrovascular Diseases Cause Movement Disorders?

A clinical profile of 103 patients with secondary movement disorders: correlation of etiology with phenomenology

M. Netravathi[a], P. K. Pal[a] and B. Indira Devi[b]

Departments of [a]Neurology and [b]Neurosurgery, National Institute of Mental Health & Neurosciences, Bangalore, India



Netravathi et al. Eur J Neurol 2012;19:226-33.

Characteristics of Patients with Movement Disorders after Stroke

Post-stroke Movement Disorders: The Clinical, Neuroanatomic, and Demographic Portrait of 284 Published Cases

Ritika Suri, MD,* Federico Rodriguez-Porcel, MD,† Kelly Donohue, MD,* Erin Jesse, BA,‡ Lilia Lovera, MD,† Alok Kumar Dwivedi, PhD,§ and Alberto J. Espay, MD, MSc*

- **Systematic review of case reports and case series**
- **Published between 1986-2016**
- **Involving 284 patients**

Suri et al. J Stroke Cerebrovasc Dis 2018;27:2388-97.

Characteristics of Patients with Movement Disorders after Stroke (Cont.)

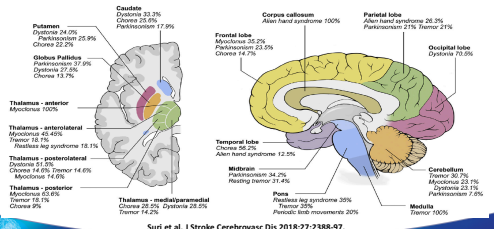
Table 1. *General characteristics of poststroke movement disorders*

Movement disorder	N (%)	Men affected, N (%)	Age years (range)	Ischemic cases N (%)	Hemorrhagic cases N (%)	Most common location N (%)
All	284	164 (57.7)	61.8 (18-93)	218 (76.7)	66 (23.2)	Posterolateral thalamus: 64 (22.5)
Dystonia	66 (23.2)	39 (40.9)	61.7 (37-76)	19 (28.7)	20 (30.3)	Posterolateral thalamus: 22 (66.6)
Chorea	46 (16.1)	25 (54.3)	61.72 (42-85)	19 (41.3)	6 (13.0)	Caudate: 5 (50)
Myoclonus	43 (15.1)	25 (58.1)	66.6 (47-83)	20 (46.5)	5 (11.6)	Frontal lobe: 9 (75)
Parkinsonism	42 (14.7)	26 (61.9)	60.7 (18-80)	25 (59.5)	1 (2.4)	Putamen: 9 (64.2)
Tremor	39 (13.7)	24 (61.5)	53.3 (18-76)	16 (41)	8 (20.5)	Midbrain: 6 (54.5)
Restless legs syndrome	20 (7.04)	7 (35.0)	65.2 (46-83)	7 (35)	0 (0)	Pons: 2 (28.5); putamen: 1 (14.2)
Alien hand syndrome	9 (3.1)	4 (44.4)	62.9 (25-83)	4 (44.4)	0 (0)	Parietal lobe: 2 (40)
Periodic limb movements	9 (3.1)	4 (44.4)	60.5 (53-75)	4 (44.4)	0 (0)	Pons: 3 (50)
Stereotypy	8 (2.8)	6 (75)	63.8 (40-93)	6 (75)	0 (0)	Putamen: 3 (37.5)
Akathisia	1 (.35)	1 (100)	60 (N/A)	1 (100)	0 (0)	Posterior thalamus: 1 (100)
Tics	1 (.35)	1 (100)	71 (N/A)	1 (100)	0 (0)	Caudate: 1 (100)

- **Male = 58%**
- **Age at onset ~62 years**
- **Ischemia vs. Hemorrhage = 77:23**
- **Dystonia is the most common MD after stroke**

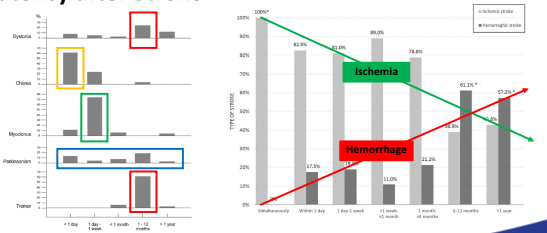
Suri et al. J Stroke Cerebrovasc Dis 2018;27:2388-97.

Lesion of Stroke and Prevalence of Movement Disorders



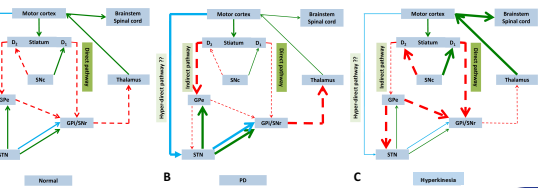
Suri et al. J Stroke Cerebrovasc Dis 2018;27:2388-97.

Latency after Stroke



Suri et al. J Stroke Cerebrovasc Dis 2018;27:2388-97.

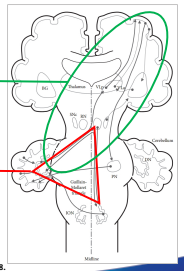
Basal Ganglia Circuitry



Cerebellar Circuitry

Cerebello-Thalamo-Cortical Loop

Guillain-Mollaret Triangle



Choi SM. J Mov Disord 2016;19:80-8.

Possible Mechanism of MD after Stroke

- One phenomenology can occur from various structural lesions
- One structural lesion can produce various phenomenology
- Only 1-4% of patients with stroke developed abnormal movements

- Therefore…
- Movement disorders occurring after stroke may not be related to structural destruction
- Network or circuitry disruption may be a possible mechanism of MD after stroke
- Ability to create neural plasticity in each patient may lead or prevent each individual from developing MD after stroke

Mehanna and Jankovic. Lancet Neurol 2013;12:597-608.

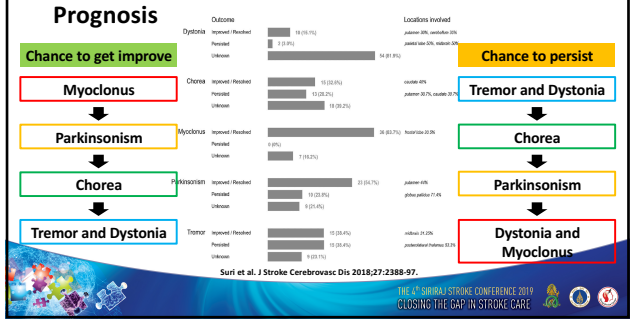
Reported Types of MD after Stroke

Panel: Movement disorders reported after cerebrovascular events

- Parkinsonism
  - Vascular parkinsonism
  - Progressive supranuclear palsy
  - Isolated freezing of gait
  - Corticobasal syndrome
- Chorea-ballism-athethosis
- Dystonia
- Tremor
- Myoclonus
- Asterixis
- Transient limb shaking
- Stereotypies
- Akathisia
- Tics

Mehanna and Jankovic. Lancet Neurol 2013;12:597-608.

Prognosis



Chance to get improve

- Myoclonus
- Parkinsonism
- Chorea
- Tremor and Dystonia

Chance to persist

- Tremor and Dystonia
- Chorea
- Parkinsonism
- Dystonia and Myoclonus

Suri et al. J Stroke Cerebrovasc Dis 2018;27:2388-97.

Treatment (Based on Case Reports and Series)

Movement disorders	Treatment
Vascular Parkinsonism - Strategic infarction (hemiparkinsonism) - Periventricular WM infarction (lower body PD)	• Rehabilitation • Control CV risks • L-dopa (show some benefit ~ 30-50%)
Chorea and ballism	• Typical and atypical Neuroleptics • Tetrabenazine • Clonazepam • Na valproate, topiramate • Vop or Vim-DBS
Dystonia	• BoNT injection • Anticholinergics • Baclofen • Benzodiazepine • GPi-DBS
Tremor - Cerebellar outflow tremor - Holmes tremor	• Propranolol • Primidone • Lisuride • L-dopa • Na valproate • Vim-DBS

Mehanna and Jankovic. Lancet Neurol 2013;12:597-608.

Treatment (Based on Case Reports and Series)

Movement disorders	Treatment
Myoclonus	• Clonazepam • Na valproate, topiramate, levetiracetam • Tetrabenazine • BoNT injection
Asterixis	• Usually improve after a few days
Transient limb shaking	• Carotid endarterectomy
Tics	• Typical or atypical antipsychotics • Clonidine
Akathisia	• Clonazepam
Stereotypies	• Clonazepam • Tetrabenazine

Mehanna and Jankovic. Lancet Neurol 2013;12:597-608.


THE 4th SIRIRAJ STROKE CONFERENCE 2019
CLOSING THE GAP IN STROKE CARE
Thank You For Your Attention